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The Where and How for Reaching Transgender Women and Men Who Have Sex with Men with HIV Prevention Services in Guatemala

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Abstract

This study aims to describe the transgender women and men who have sex with men (MSM) missed through venue-based sampling and illustrate how data on venues can be used to prioritize service delivery. Respondent-driven sampling (RDS) and time-location sampling (TLS) were used concurrently in 2010 for behavioral surveillance among MSM and transgender women in Guatemala City. RDS recruits who did not frequent venues (n = 106) were compared to TLS recruits (n = 609). TLS participants recruited at different types of venues were compared. RDS recruits who did not frequent venues were less educated, less likely to identify as gay, more likely to have concurrent partners and female sexual partners. Participants recruited at NGOs, saunas, hotels, streets and parks had more partners, were more likely to receive money for sex or have concurrent partners. Prevention programs for MSM and transgender women should characterize

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Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

social venues and people that frequent them and improve service coverage through venues and social networks.

Keywords

HIV; MSM; Surveillance; HIV prevention; RDS; TLS

Introduction

Male-to-female transgender women and men who have sex with men (MSM) are at increased risk of HIV infection in countries worldwide. In low- and middle-income countries, such as Guatemala, transgender women are, on average, 50 times as likely and MSM are 19 times as likely to be infected with HIV than the general population [1, 2]. The HIV prevalence among MSM in Latin American and Caribbean countries varies greatly from 2% in Uruguay to 31% in Mexico with a median of 11% [3]. In 2013, the prevalence was 9% among MSM and 24% among transgender women in Guatemala City [4]. The importance of intervening among MSM and transgender women to prevent HIV infection has been extensively recognized by international funding mechanisms and national governments [5].

In the U.S., venues where MSM socialize, meet new partners or have sex were identified early in the epidemic as locations to collect surveillance data and to prevent new infections [6]. Time-location sampling (TLS), a venue-based method, and respondent-driven sampling (RDS) have been used to recruit MSM and transgender women and inform prevention programs in numerous countries [7–17]. In contexts where social stigma and homophobia hinder the feasibility of recruitment in venues, RDS, which relies on peer referral to a study site, is a more effective recruitment strategy. Published examples of methods to identify venue-specific subpopulations at increased risk and tailor interventions to specific types of venues are lacking.

In 2010, MSM and transgender women in Guatemala City were recruited simultaneously into an RDS and a TLS behavioral surveillance survey (parent study) to compare the efficiency of the two methods and differences in the populations recruited [18]. This study examines the value of surveillance data collected from MSM and transgender women through RDS and venues for the design of prevention programs. The objectives are to compare the sexual behavior and access to prevention services among the MSM and transgender population reached through (1) venue-based sampling versus respondent-driven sampling; and (2) different types of venues as part of venue-based sampling.

Methods

Parent Study

The RDS-TLS comparison parent study was conducted in 2010 to compare RDS and TLS as sampling strategies to recruit MSM and transgender women into HIV-related research and prevention programs [18]. The objectives of the parent study were to compare the sociodemographic characteristics, indicators of HIV risk behavior, access to HIV prevention

services, geographic coverage, cost and time required for the two recruitment methods. Recruits from both recruit strategies were at least 18 years of age, residents of the greater metropolitan area of Guatemala City and had at least one male sexual contact in the past 12 months. The study was approved by the U.S. Centers for Disease Control and Prevention's Global AIDS Program Associate Director for Science Office and the Del Valle University of Guatemala's institutional review board. Questions covered sociodemographic characteristics, attendance of social venues, sexual history, condoms use with different types of partners, access to HIV testing, condoms and information, education and communication programs (IEC) on HIV.

Measures

Sexual behavior and HIV prevention access outcomes were measured based on the behavioral questionnaire, administered by trained interviewers at sites frequented by MSM and transgender women (TLS survey) or at the RDS study site (RDS survey). In the current study, the outcomes of interest include: more than ten male partners, receiving money for sex, having concurrent partners, sex with a female partner, HIV testing, receipt of free condoms and lubricant and exposure to peer or outreach workers providing IEC, all within the past 12 months.

Exposure variables include: type of recruitment venue in TLS, categorized by study staff as bar, club, mall, restaurant/café, sauna/hotel, street/park or non-governmental organization (NGO). The internet café and movie theater venue types were excluded due to the small number of participants recruited from these sites. At times, NGOs offered specific HIV prevention activities but they also served as safe spaces or drop-in centers and were therefore considered a type of social venues. One specific NGO rarely offered a complete package of services, rather the different NGOs were complimentary to each other with regard to the services provided.

The average number of potential participants at a site was measured by counting the number of men and trans-gender women that appeared to be over the age of 18 at the site during a 4-h visit. The percent of eligible participants was based on the number of men and transgender women that met the eligibility criteria divided by the number of people approached during the 4-h visit. The estimated number of eligible MSM and transgender women per site was calculated for each site by multiplying the number of men enumerated at a site by the percent eligible. The number of MSM and transgender women at each site and by each type of site is helpful to plan for mobile service delivery, e.g. the number of outreach workers, condoms, HIV tests or other supplies needed.

Statistical Analysis

RDS participants who did not frequent venues were compared to the TLS participants to answer the question of which sub-populations are missed by a venue-based approach. TLS subpopulations were characterized on sexual behaviors and access to prevention services by the type of recruitment venue.

For bivariable analyses, TLS percentages were calculated using survey procedures with the venue-day-time event as the cluster and the month as the stratum. TLS sampling weights

were calculated as the inverse of the product of three-stage selection probabilities, in which the stages comprised sampling of venues, venue-day-time units and participants. The adjustment of the sampling weights was described previously [18]. RDS percentages were calculated for the sociodemographic factors and outcomes using the Respondent Driven Sampling Analysis Tool version 7.1 (Cornell University, Ithaca, NY, USA). TLS analyses were performed using SAS 9.4 (SAS Institute Inc., Cary, NC USA). Chi square, z scores and respective p values to compare RDS and TLS populations were calculated in Microsoft Excel.

Log binomial models were used to calculate prevalence ratios for behavioral and prevention access outcomes by the type of recruitment venue. To compare indicators of risk behavior and access to prevention services by the types of recruitment venue (Tables 3, 4), general estimating equations (GEE) were used to account for correlation among participants recruited at the same venue-day-time event and TLS weights were applied.

Results

RDS Participants versus TLS Participants

Most RDS participants (n = 401, 79%) reported frequenting venues to meet new partners or socialize. As expected, RDS participants who did not go to venues (n = 106, 21%) were somewhat different from their TLS counterparts (n = 609). RDS recruits who did not frequent venues were less likely to have a university education (11 vs. 27%, $\chi^2 = 13$, $p = 0.002$) and were less likely to identify as gay (26 vs. 49%, $\chi^2 = 9$, $p = 0.01$) (Table 1). There were no significant differences based on age or income. With regard to their sexual behavior, the RDS recruits who did not frequent venues were more likely to have concurrent partners (57 vs. 33%, $z = 2.3$, $p = 0.02$) or have sex with women (49 vs. 27%, $z = 2.2$, $p = 0.03$). RDS recruits accepted money for sex (46 vs. 28%, $z = 1.7$, $p = 0.1$) more often but were less likely to have at least ten sexual partners in the past 12 months (20 vs. 27%, $z = -0.8$, $p = 0.4$) though these differences were not statistically significant.

There were no differences in access to HIV prevention services. Among RDS participants who did not frequent venues, 54% were tested for HIV in the past year compared to 62% from TLS. Seventy percent versus 73% received free condoms and 61 versus 69% received free lubricant among non-venue-going RDS and TLS participants, respectively. IEC efforts reached 56% of RDS participants who did not frequent venues versus 44% of TLS participants.

Venue Recruitment Patterns

TLS participants were recruited primarily in clubs and at street or park sites (Table 2). Smaller proportions were recruited at bars, movie theaters, malls, restaurants/cafes, internet cafes, saunas/darkrooms/hotels/spas and NGOs. At NGOs, saunas, hotels and clubs, over 80% of people interviewed were eligible, i.e. MSM or transgender women. However, saunas and hotels are estimated to have an average of 16 MSM and transgender women at a busy time while clubs average 132 MSM and transgender women. On the other hand, MSM and

transgender women interviewed at NGOs report the highest number of peers, peers who could be potentially reached through a social network-based intervention.

TLS participants recruited at NGOs, streets, parks, saunas and hotels were more likely to have more than ten male partners and receive money for sex in the past 12 months compared to people from bars (Table 3). Participants from malls, saunas and hotels were more likely to have concurrent partners. There were no differences by venue in relation to sex with women. Associations between risk behaviors and venue types of were organized into a figure to help programs reach the target population (Fig. 1).

Participants recruited at NGOs had the best access to HIV prevention services with overall coverage greater than 85% while HIV testing was low among men and trans-women from restaurants and cafes and access to free condoms was also low among people at malls, saunas and hotels (differences not statistically significant when bar used as the reference) (Table 4). Additionally, those recruited in parks or on streets were less likely to be exposed to an IEC intervention in the past year.

Discussion

In Guatemala City, different men and transgender women were reached with RDS compared to TLS. A better educated, gay-identifying population was more likely to frequent venues, and RDS participants who did not frequent venues were more likely to be less educated and to identify as heterosexual or bisexual. Based on the behavioral self-report, the non-venue-going RDS population was more likely to have sex with women and have concurrent partners. These findings are relevant given that in theory, the adjusted results from a RDS and TLS survey reflect the same population.

RDS has been shown to reach different sub-populations of intravenous drug users over time and when recruitment chains were compared to one another in Seattle, WA, USA [19, 20] There were marked differences between the RDS population and the underlying general population in Uganda indicating that RDS is not always externally valid [21]. Comparisons of RDS and TLS populations of black MSM in San Francisco, CA, USA and MSM in Fortaleza, Brazil concluded that RDS was more effective at reaching men of low socio-economic status and bisexual men [22, 23]. However, in Shenzhen, China, RDS reached a younger, more educated, gay-identifying population [24]. Characteristics of the populations reached using a venue-based or social network-based approach has implications for delivery of prevention services and the ability to tailor interventions for specific sub-groups.

TLS recruits from saunas, hotels, streets and parks had more of sexual partners, were more likely to have concurrent partners and to receive money for sex. Men and transgender women at these types of venues were considered at high risk and hence in need of prevention interventions. Saunas or bathhouses are historical hotspots for HIV and STI transmission among MSM in the U.S. and in China where men at saunas were 15 times as likely to be infected with HIV compared to those at bars [6, 25–30]. Parks and streets are known as principal venues for sex work for men in Guatemala City.

Based on our analysis, NGOs were effective at reaching MSM and transgender women at highest risk as seen by the higher number of sexual partners and prevalence of sex work. NGOs also reached people who have large social networks, over half of whom knew more than 100 MSM and transgender women. Prevention programs can take advantage of social networks by encouraging NGO members to refer their peers to IEC activities, HIV testing and linkage to HIV care to reach more people in need of services [31]. Social network based interventions have been used in the past to increase HIV testing and identify unrecognized HIV infections [32, 33]. Two main models of social network interventions could be drawn on to reach MSM and transgender women who do not frequent venues: the Peer Education and the Popular Opinion Leader models [34–36].

Limitations

Interviewers in the TLS study arm may have introduced selection bias by approaching men whom they thought were likely to be eligible resulting in a high number of estimated eligible MSM and transgender women at high-traffic mall and street sites. To counter this bias, interviewers were trained to systematically approach men who looked at least 18 years old and initiate eligibility screening. Preferential recruitment would have led to a lower percentage of heterosexual- or bisexual-identifying MSM in the TLS survey and would overestimate the number of eligible MSM and transgender women from sites. That said, based on this study MSM who identify as heterosexual or bisexual were less likely to admit to same-sex behavior when interviewed in a public venue and would be more difficult to reach through a venue-based approach. All participants were interviewed face-to-face, a potential source of social-desirability bias. This would lead participants to underestimate risk practices. However, careful selection and training of interviewers was carried out to establish rapport with participants and hence reduce bias. Recall bias could have affected data on events that occurred months or years before the study took place leading to underestimates of prevention coverage and sexual partnerships. Though, all questions referred to events in the preceding 12 months to minimize bias. Finally, no biological endpoints were measured as part of this study and therefore risk of HIV infection can only be inferred through behaviors known to be risk factors.

Recommendations

We cannot be certain whether these differences in populations by recruitment strategy and venue type will generalize to other settings, but these findings do suggest the importance of carefully assessing the groups reached by different strategies. Program managers should collect and use data on venues, people who frequent them and those that do not to identify gaps in program coverage and sub-populations at increased risk. Data on venues for prioritization of prevention intervention delivery are key for optimal use of resources and greatest impact [37]. Venues where MSM and transgender women socialize are low-hanging fruit for HIV preventions services such as condom and lubricant distribution, HIV testing and linkage to care, community empowerment, violence prevention, harm reduction, post-exposure prophylaxis (PEP) and pre-exposure prophylaxis (PrEP). Given the number of MSM and transgender women enumerated and the percent eligible for the study, it is likely that service delivery at clubs will offer a higher yield in terms of people reached compared to other venues. Parks, streets and malls were high volume sites but low eligibility mean it

would be difficult to target MSM specifically. To reach MSM and transgender women in Guatemala City with the greatest number of partners and those most likely to sell sex, prevention programs should offer a complete selection of services at NGOs, saunas, hotels, streets and parks. Men and transgender women with the largest social networks were interviewed at NGOs, parks and streets. Social networks can be leveraged to reach more hidden populations that identify as bisexual or heterosexual and people who do not frequent social venues [38]. Figure 1 summarizes the recommendations based on the results from study. Program managers could use a similar diagram with local data to better reach targets and achieve greater impact.

Conclusions

Organizations implementing prevention programs for MSM and transgender women can harness data on venues to make condoms, lubricant, HIV testing, linkage to care and other prevention services such as PrEP and PEP available at venues frequented the populations, particularly in venues where the patrons have a higher numbers of partners, are more likely to sell sex and have concurrent partners. Venue-based service delivery can be combined with interventions through social networks to reach people missed by venue-based service delivery.

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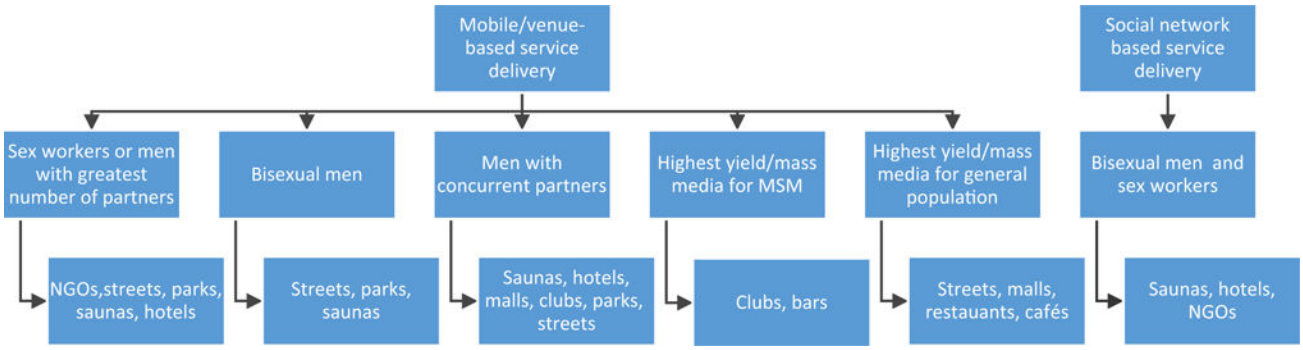

Fig. 1.

Illustrative decision tree for delivery of prevention services to subpopulations of MSM and transgender women in Guatemala City

Table 1

Comparison of MSM and transgender women recruited through RDS who do not frequent venues to the TLS sample

Variable	RDS non-venue frequenting (n = 106) %	TLS (n = 609) %	Test statistic	*p* value
Age				
18–24	37.1	39.8	4.1[a]	0.1
25–34	28.6	42.1		
35+	34.4	18.1		
Education				
Primary education or less	29.3	18.4	12.8[a]	0.002
At least some secondary education	59.9	55.1		
At least some university education	10.8	26.5		
Monthly income				
<$300	73.6	55.2	2.1[a]	0.5
$300–500	17.7	24.4		
$501–800	5.5	13.2		
>$800	3.2	7.1		
Sexual identity				
Hetero/bisexual	59.5	42.8	8.5[a]	0.01
Gay	25.6	49.0		
Transgender	14.9	8.2		
Sexual behaviors, past 12 months				
>10 male partners	19.5	26.5	−0.8[b]	0.4
Sold sex	45.6	28.4	1.7[b]	0.1
Concurrent sexual partners	56.7	32.7	2.3[b]	0.02
Sex with women	49.1	27.1	2.2[b]	0.03
Prevention access, past 12 months				
HIV testing	54.1	62.3	−0.9[b]	0.4
Free condoms	69.6	73.1	−0.4[b]	0.7
Lubricant from HF or NGO	61.4	69.4	−0.9[b]	0.4
Participated in IEC activity	55.7	44.3	1.4[b]	0.2

HF health facility, *NGO* nongovernmental organization, *IEC* information, education and communication

[a] χ^2,

[b] *z*-score

Table 2

Type of venues where TLS participants were recruited, estimated MSM and transgender women per venue and percent of participants with a large social network of MSM

Type of venue	Participants recruited		Average enumerated potential MSM and TGW per site[a] (A)	Eligible MSM and TGW % (B)	Estimated eligible MSM and TGW per site (A × B)	Large social network[b] %
	n	%				
Bar	71	11.7	170	41.8	71	6.8
Club	165	27.1	160	82.9	132	4.5
Restaurant/café	54	8.9	134	61.1	82	11.9
Mall	62	10.2	802[c]	26.1	209[c]	7.0
Park/street	135	22.2	680[c]	39.0	265[c]	20.3
Sauna/hotel	44	7.2	18	91.9	16	18.6
NGO	58	9.5	43	92.4	40	56.1
Internet café	13	2.1	33	32.0	10	1.7
Movie theater	7	1.1	79	72.7	57	0.0
Total	609	100.0	316	51.0	161	14.1

TGW transgender women

[a] In a 4-h period considered to be a time when many MSM and transgender women are likely to be present

[b] Defined as knowing more than 100 MSM and transgender women in Guatemala City

[c] Due to high pedestrian traffic

Table 3

Sexual behaviors in past 12 months among TLS recruits by type of recruitment venue

Recruitment venue	>10 partners			Received money for sex			Concurrent partners			Sex with women		
	%	PR [χ^2, *p* value]	(95% CI)	%	PR [χ^2, *p* value]	(95% CI)	%	PR [χ^2, *p* value]	(95% CI)	%	PR [χ^2, *p* value]	(95% CI)
Bar	9.4	1 (Ref)	–	1.6	1 (Ref)	–	18.3	1 (Ref)	–	17.3	1 (Ref)	–
Club	11.9	1.3 [0.1, 0.8]	(0.2, 8.6)	20.5	12.8 [8.0, 0.005]	(2.2, 74.6)	40.1	2.2 [3.2, 0.07]	(0.9, 5.2)	22.5	1.3 [0.2, 0.7]	(0.4, 4.2)
Restaurant/café	5.1	0.5 [0.6, 0.4]	(0.1, 2.5)	5.2	3.3 [2.6, 0.1]	(0.8, 13.7)	22.0	1.2 [0.2, 0.6]	(0.5, 2.6)	27.3	1.6 [1.3, 0.2]	(0.7, 3.4)
Mall	11.9	1.3 [0.1, 0.8]	(0.3, 6.3)	8.0	5.0 [2.9, 0.09]	(0.8, 31.4)	47.4	2.6 [5.6, 0.02]	(1.2, 5.7)	8.2	0.5 [1.2, 0.3]	(0.1, 1.8)
Park/street	45.5	4.8 [5.6, 0.02]	(1.3, 17.8)	49.8	31.0 [24.4, <0.001]	(7.9, 121.4)	35.0	1.9 [2.4, 0.1]	(0.8, 4.4)	37.1	2.1 [2.2, 0.1]	(0.8, 5.9)
Sauna/hotel	37.5	4.0 [3.4, 0.08]	(0.9, 18.4)	54.1	33.7 [20.7, <0.001]	(7.4, 153.0)	47.8	2.6 [5.5, 0.02]	(1.2, 5.8)	31.0	1.8 [0.6, 0.4]	(0.4, 7.5)
NGO	62.0	6.6 [5.7, 0.02]	(1.4, 30.8)	76.4	47.6 [28.3, <0.001]	(11.5, 197.4)	26.6	1.5 [1.2, 0.3]	(0.7, 2.9)	11.2	0.6 [0.6, 0.5]	(0.2, 2.0)

PR prevalence ratio

Table 4

Exposure to prevention services, past 12 months, TLS recruits by type of recruitment venue

Recruitment venue	Tested for HIV			Received free condoms			Received lubricant			Exposed to IEC		
	%	PR [χ^2, *p* value]	(95% CI)	%	PR [χ^2, *p* value]	(95% CI)	%	PR [χ^2, *p* value]	(95% CI)	%	PR [χ^2, *p* value]	(95% CI)
Bar	76.0	1 (Ref)	–	64.1	1 (Ref)	–	77.6	1 (Ref)	–	57.6	1 (Ref)	–
Club	49.0	0.6 [2.4, 0.1]	(0.4, 1.1)	89.5	1.4 [4.7, 0.03]	(1.0, 1.9)	67.3	0.9 [0.7, 0.4]	(0.6, 1.2)	42.3	0.7 [0.9, 0.3]	(0.4, 1.4)
Restaurant/café	40.5	0.5 [13.0, <0.001]	(0.4, 0.8)	58.7	0.9 [0.1, 0.7]	(0.6, 1.5)	62.8	0.8 [1.9, 0.2]	(0.6, 1.1)	49.3	0.9 [0.6, 0.5]	(0.6, 1.3)
Mall	63.0	0.8 [1.0, 0.3]	(0.6, 1.2)	58.4	0.9 [0.1, 0.8]	(0.5, 1.6)	52.1	0.7 [2.1, 0.1]	(0.4, 1.1)	47.4	0.8 [0.3, 0.6]	(0.4, 1.6)
Park/street	67.4	0.9 [0.7, 0.4]	(0.7, 1.2)	79.2	1.2 [1.7, 0.2]	(0.9, 1.7)	73.8	1.0 [0.1, 0.7]	(0.7, 1.3)	35.6	0.6 [4.7, 0.03]	(0.4, 1.0)
Sauna/hotel	79.0	1.0 [0.1, 0.8]	(0.8, 1.3)	53.8	0.8 [0.2, 0.7]	(0.4, 1.9)	55.8	0.7 [1.8, 0.2]	(0.4, 1.2)	75.5	1.3 [1.1, 0.3]	(0.8, 2.2)
NGO	84.9	1.1 [1.7, 0.2]	(0.9, 1.3)	89.0	1.4 [2.8, 0.1]	(0.9, 2.0)	94.7	1.2 [4.2, 0.04]	(1.0, 1.5)	88.7	1.5 [5.1, 0.02]	(1.1, 2.2)

PR prevalence ratio